Global Long-term Land Surface Products from MERRA-2 at GES DISC

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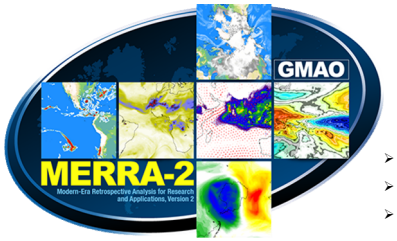
https://disc.gsfc.nasa.gov

Outline

- What is MERRA-2
- View A Drought Case with MERRA-2
- List of Land Surface Data
- Overview of Data Services:
  - How to find and download data
  - Giovanni

MERRA-2:

(Modern-Era Retrospective analysis for Research and Applications, Version 2)



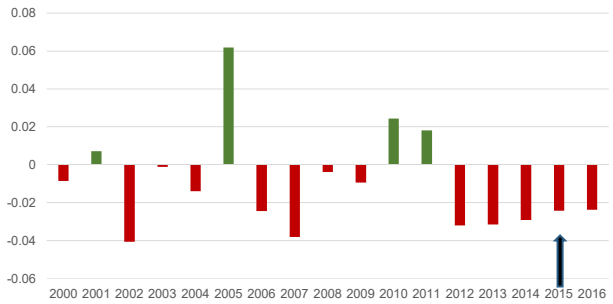
MERRA-2 logo from https://gmao.gsfc.nasa.gov/reanalysis/MERRA-2/

- Meteorology
- Atmospheric chemistry
- Aerosols
- Land
- Ocean

- **Model: NASA GEOS-5**
- **Temporal Coverage:** 1980-present
- **Temporal Resolution:** hourly, 3-hourly, and monthly
- **Spatial Coverage:** Global
- **Spatial Resolution:** 0.5°x0.625°
- **Data Format:** NetCDF-4

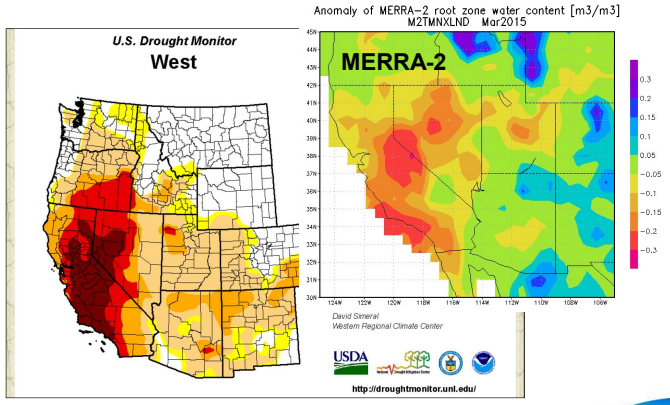
Root Zone Soil Water, MERRA-2

March, Anomaly from Climatology (1980-2014)

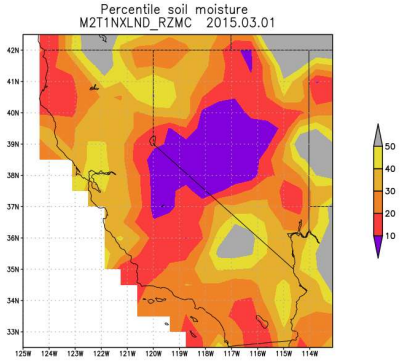


Note: The Monthly Climatology were generated with monthly data from 1980 to 2014

Monthly Root Zone Soil Water Anomaly



Calculating Soil Moisture Percentiles



Climatology base period: 1980.01.01 – 2014.12.31

MERRA-2 Land Surface Data Examples

https://gmao.gsfc.nasa.gov/pubs/docs/Bosilovich785.pdf

- M2T1NXLND: Land Surface Diagnostics
  - water root zone, water surface layer
  - soil temperatures (layer 1-6)
  - evaporation , runoff
  - leaf area index, greenness fraction
- M2T1NXFLX: Surface Flux Diagnostics
  - bias corrected total precipitation, snowfall
  - surface specific humidity
  - surface wind speed
- M2CONXLND: Constant Land-Surface Parameters
  - Soil porosity
  - Thickness of soil (layer 1-6, root zone, surface layer, …)

Other Land Surface Data At GES DISC

Precipitation from satellites

- ✓ **TRMM - TMPA : (1998.01 – present)**
- ✓ **GPM - IMERG: (2014.03 – present)**

Land Surface Data Assimilation:

- ✓ **NLDAS:** North American Land Data Assimilation System
- ✓ **GLDAS:** Global Land Data Assimilation System
- ✓ **FLDAS:** Famine Early Warning Systems Network (FEWS NET) Land Data Assimilation System
- ✓ **NCA-LDAS:** National Climate Assessment - Land Data Assimilation System
- ✓ **GRACE-DA-DM:** GRACE Data Assimilation (DA) for Drought Monitor (DM)

Other Merged products

- ✓ **LANDMET:** Land Surface Atmospheric Boundary Interaction Product

Data Services at GES DISC

Data downloading Services:

HTTPS: Direct access

Data Search System: Search and download

Data Subsetter: parameter and spatial subsetter

Visualization Services:

Giovanni : Online Data Visualization and Analysis

Interoperable Services:

OPeNDAP : Open-source Project for a Network Data Access Protocol

GDS : GrADS Data Server

OGC /WMS : Open Geospatial Consortium /Web Map Service

Online Help Documents:

FAQ: short description of frequently asked questions

Data How-To: (Recipes) Detailed examples on How to access and work with data

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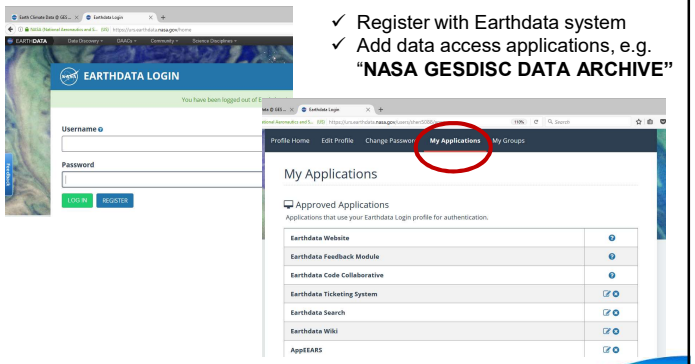
Registration to NASA Data System

https://urs.earthdata.nasa.gov/

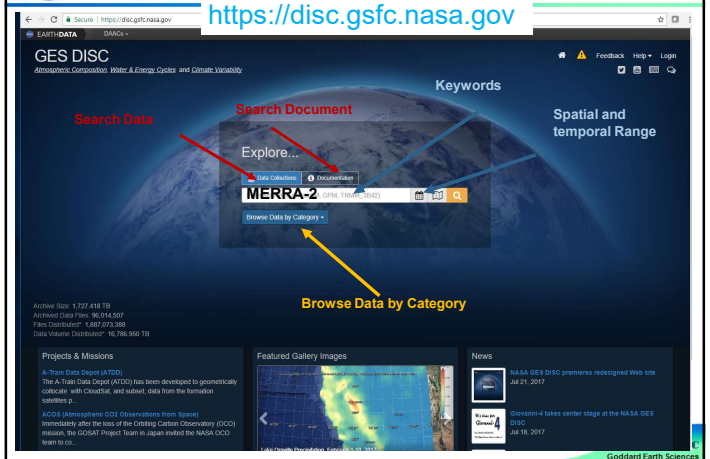


- ✓ Register with Earthdata system
- ✓ Add data access applications, e.g. **"NASA GESDISC DATA ARCHIVE"**

GES – DISC Goddard Earth Sciences Data Information Services Center

NASA GES DISC *New* Portal

https://disc.gsfc.nasa.gov



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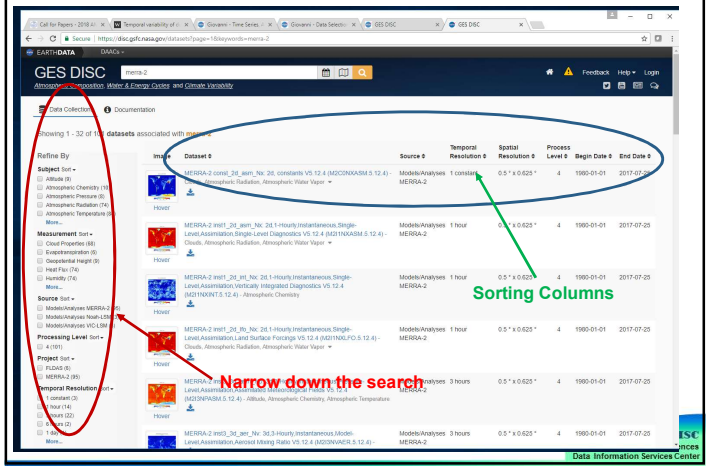
NASA GES DISC Product List Page



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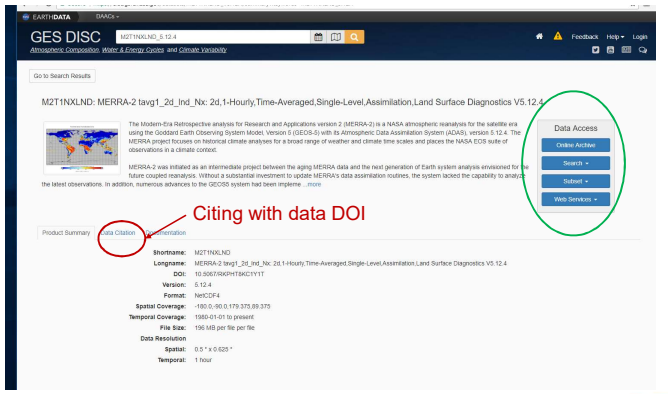
Product Landing Page



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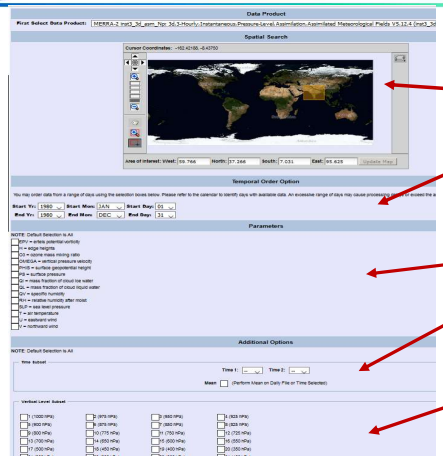
Providing Subsetted data Service



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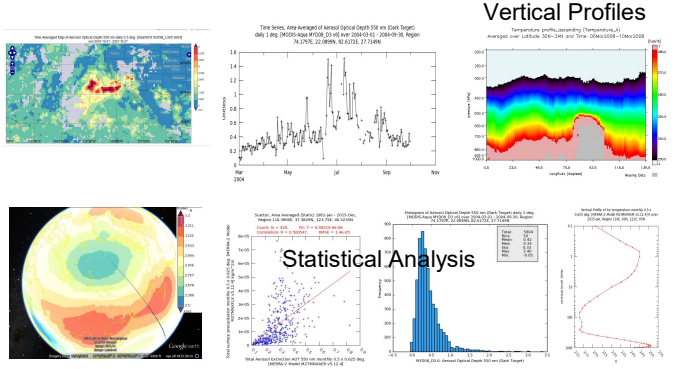
Giovanni: Online Visualization Features

https://giovanni.gsfc.nasa.gov



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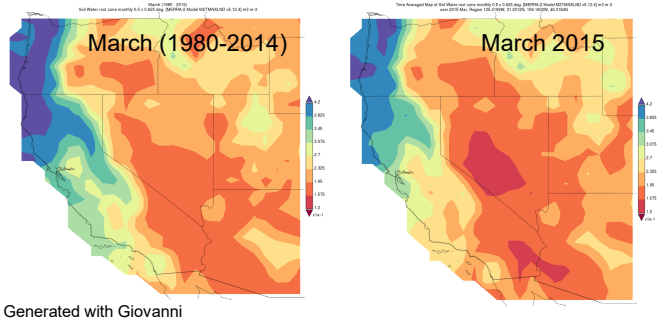
Root Zone Soil Water from MERRA-2

Example images from Giovanni



Generated with Giovanni
https://giovanni.gsfc.nasa.gov/giovanni/#service=QuCl&starttime=1980-01-01T00:00:00Z&endtime=2014-12-31T23:59:59Z&months=03&bbox=-125.4,31.2,-109.2,46.3&data=M2TMNXLND_5_12_4_RZMC

https://giovanni.gsfc.nasa.gov/giovanni/#service=TmAvMp&starttime=2015-03-01T00:00:00Z&endtime=2015-03-31T23:59:59Z&bbox=-125.4,31.2,-109.2,46.3&data=M2TMNXLND_5_12_4_RZMC

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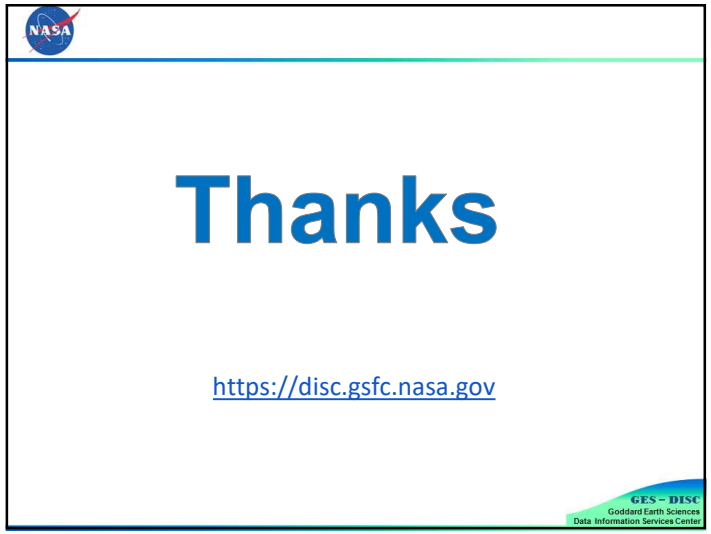
NASA
Thanks
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